Fueling California's Economy

Through business and community partnerships, LLNL's science, technology, and engineering positively impacts the state's economy

LLNL's Economic Impact

Lawrence Livermore National Laboratory (LLNL), located in Livermore, California, is a research and development facility for science and technology solutions to some of our nation's greatest challenges. Managed by Lawrence Livermore National Security, LLC, LLNL has an annual budget of $1.7 billion, and 6,500 employees. It is largely funded by the Department of Energy's National Nuclear Security Administration.

LLNL's economic impact in California manifests itself directly through its payroll to its employees, and through procurements awarded to companies operating within the state. The Laboratory stimulates commercial activity through the transfer of its technologies to licensees ranging from startups to established companies. LLNL also develops research-based public-private partnerships to improve business access to world-class scientific capabilities to help them improve their technologies.

In Fiscal Year 2016, LLNL awarded $526 million in procurements to businesses, both in California and across the nation, for a broad range of products and services that support the Laboratory's overall mission. California awards topped $243 million. In addition, the Laboratory workforce's more than $787 million payroll base, equating to approximately $66 million in monthly salary, directly contributes to the regional economy.

California Success Stories

Metal Improvement Company (MIC): high-strength metals, Livermore, CA. This subsidiary of Curtiss-Wright Surface Technologies teamed with LLNL to develop laser peening, a treatment that strengthens and increases the durability of metals used in aircraft parts and turbines for electric generators (shown above).

Cepheid: molecular diagnostics, Sunnyvale, CA. In 1996, a former LLNL researcher co-founded Cepheid to turn rapid polymerase chain reaction-based assays into commercial products for diagnosing diseases.

IDES: time-resolved electron microscopy products, Pleasanton, CA. Founded by a scientist who did his Ph.D. research at LLNL, Integrated Dynamic Electron Solutions produces dynamic transmission electron microscopes (DTEMs), a technology that uses lasers to substantially increase spatial and temporal resolution over the conventional TEM.

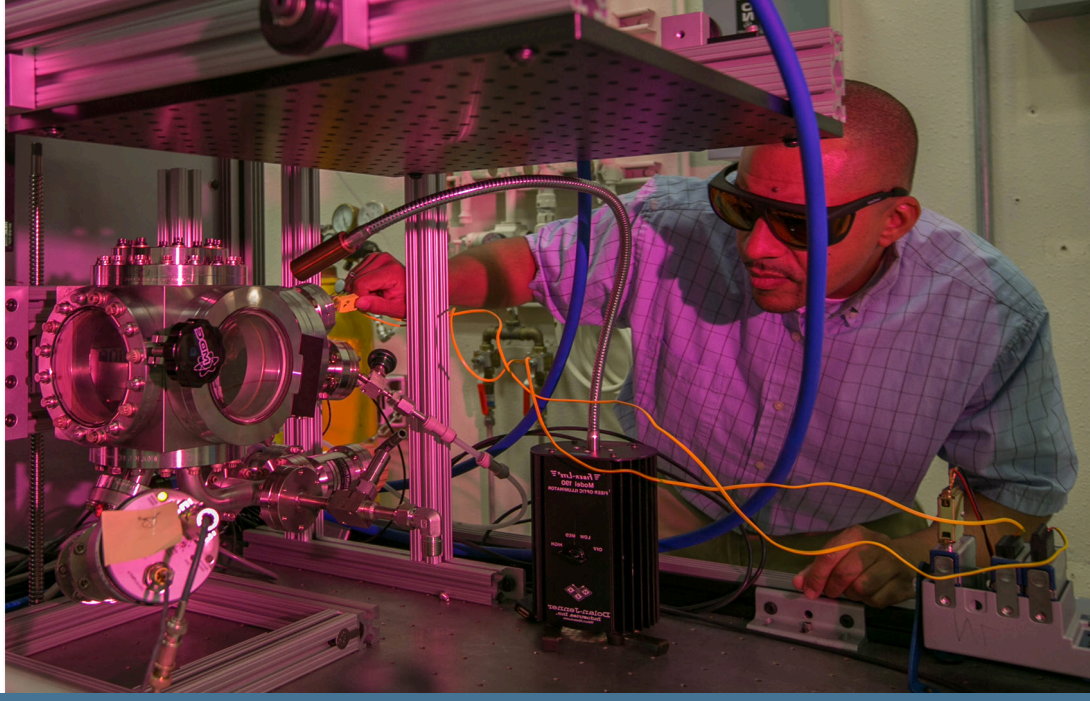
Bio-Rad and QuantaLife: life science and clinical diagnostics, Hercules, CA. LLNL scientists co-founded QuantaLife, which commercialized LLNL's anti-bioterrorism detector technology into genetic screening tools that use an oil emulsion to atomize a single sample into thousands of equivalent, nanoliter droplets. Bio-Rad Laboratories acquired QuantaLife in 2011.

FY2016 LLNL CALIFORNIA PROCUREMENTS

$243 M
CA PROCUREMENT AWARDS

$526 M
TOTAL PROCUREMENT AWARDS

- **110** companies with active commercial licenses, **50** based in California
- Nearly **$8.5M** in license and patent revenue, the highest of any DOE lab



LLNL as a Business Partner

The Laboratory is focused on innovation initiatives that will develop public/private partnerships and grow high-technology business opportunities in the Tri-Valley and greater San Francisco Bay region. Furthering these goals are LLNL's relationships with regional organizations such as the Bay Area Council, East Bay Economic Development Alliance, Silicon Valley Leadership Group, and the Innovation Tri-Valley Leadership Group.

LLNL's Innovation and Partnerships Office (IPO) serves as a focal point for the Lab's engagement with industry. Whether through technology commercialization, encouraging entrepreneurship, or business development activities, the primary mission is to grow the economy by advancing the development and commercialization of scientific discoveries.

IPO has active commercial licenses with 110 companies as well as dozens of active cooperative research and development agreements (CRADAs). Licensing and royalty income in recent years has topped $8 million annually, representing more than $300 million in annual sales of products based on LLNL technologies. LLNL-licensed technologies have enabled the launch of numerous new businesses that are helping to drive economic growth locally, regionally, and beyond. Additionally, the Laboratory participates in events and organizations that support technology innovation and business development:

- **University partnerships:** LabCorps and the National Lab Entrepreneurial Academy.
- **International partnerships:** The electromechanical battery (EMB) is a potential solution for grid storage applications. Through an international partnership, plans to produce EMBs in California are in development .
- **Industry/non-governmental organizations:** High Performance Computing for Manufacturing – managed by Livermore, HPC4Mfg unites the world-class computing resources and expertise of Department of Energy national laboratories with U.S. manufacturers to deliver solutions that could revolutionize manufacturing.
- **Community partnerships:** the i-GATE innovation hub in Livermore, CA, is a regional partnership to support entrepreneurs, and the Innovation Tri-Valley Leadership Group advocates for the regional innovation ecosystem.
- **Government partnerships:** Laboratory Investor Knowledge Seminar (LINKS) Silicon Valley event helps connect investors to LLNL technology.
- **State partnerships:** California Network for Manufacturing Innovation.

Expanding Partnerships

The Livermore Valley Open Campus (LVOC) is a joint collaboration between Lawrence Livermore and Sandia National Laboratories/California. LVOC is an open, unclassified research and development space that houses more than 250,000 square feet of laboratory, office, and collaboration amenities on the east side of the Laboratory sites. It is designed to facilitate interactions with industry and academia on research in such fields as high-performance computing, energy and environmental security, economic security, cybersecurity, and non-proliferation.

The High Performance Computing Innovation Center (HPCIC) is the newest addition to the LVOC. The HPCIC opened in 2010 and provides companies with access to LLNL's supercomputers, software and domain expertise, as well as guidance on the application of advanced computing technologies.

Proposed new HPCIC.

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